Product Description

The use of wireless data communication technologies in automation systems is a trend in expansion growing. There are several use advantages of wireless technology and their dissemination is above their real potential, specially because there are doubts about security, performance and reliability in this kind of communication. The wireless communication solutions reduce significantly the cabling, installation and commissioning costs. Furthermore, it is also extended to the maintenance phase because this kind of communication permits the access to data that cannot be access using wire technologies. The access to these data and their further analysis can prevent unnecessary process interruptions, which increases the plant availability, productivity and security.

The standard WirelessHART is ideal technology to wireless communication for industrial systems, offering a secure and reliable way with a complete range of applications in process monitoring and control and asset management. Based on the HART well-known protocol, WirelessHART allows the users to use the benefits of the wireless technology in fast and easy so that to maintain the compatibility with existing devices, tools and systems.

WirelessHART Manager AL-2435 allows that the automation systems and assets management stations are connected to wireless sensor networks of the WirelessHART standard. The product provides a solution that allows the industrial plants, such as metallurgy, sanitation and oil and gas to be monitored for the detection and prediction of faults, in a way to increase the assets availability and minimize the shutdown time. The addition of wireless instrumentation to industrial plants allows monitoring the variables, which had not been measured before, by dedicated systems, or systems integrated in the assets management tools.

Furthermore, AL-2435 can also be used to monitor the different tools, which enable the connection through WirelessHART, such as temperature, pressure, level and corrosion transmitters. Conventional tools that use the HART standard can also be connected to the network using adaptors, which allows mounting the telemetry system of industrial park.

The connection between AL-2435 and the system is performed by means of an Ethernet interface available on the equipment, allowing connectivity with other field networks. Thus, it is possible to expand the Altus solution to the Assets Management, permitting that the same client tool has an access to the assets data connected either to the wired networks or to the wireless networks. Such access is provided by encapsulating the HART messages exchanged between AL-2435 and the instruments.

WirelessHART Manager AL-2435 can be connected to automation equipment, such as Programmable Controllers, responsible for the plant process control. For this purpose, the WirelessHART network tools variables are mapped and accessed through the MODBUS TCP protocol.

The photo illustrates the product, whose main features are:

- WirelessHART communication standard
- IEEE 802.15.4 radio standard, which uses channels about 2.4 GHz for operation
- Coexistence with other technologies operating in and out the same spectral range
- Network security using cryptography and security keys that impede the access to the network without using them
- Algorithm for messages publishing in an efficient way, aiming maximizing the use of the battery devices and or techniques for wireless devices feeding
- Ethernet communication interface
- HART Protocol for communication with asset management tools
- MODBUS TCP Protocol for connection to the process control system
- Aluminum casing with protection degree IP 65 for outdoor use
- Removable antenna with possibility to use an external antenna
- WirelessHART network with capacity up to 50 nodes
- Configuration and monitoring through an integrated web server
- Monitoring of the network typology by means of a graphic interface with all devices information
- Feeding option using PoE (Power over Ethernet) by means of external adaptors or injectors
- Real time clock with synchronization through NTP protocol

Ordering Information

Included Items

The product package contains the following items:

- AL-2435
- Antenna
- Power supply connector
- Ethernet connector
- Installation Guide

Product Code

The following code shall be used to purchase the product:

Code	Name
AL-2435	WirelessHART Manager

Related Products

The following products shall be purchased separately, whenever necessary:

Code	Name
AL-1535	Power supply source 24 Vdc 2,5 A
AL-1536	Power supply source 24 Vdc 5 A

Features

General Features

	AL-2435
Type of Module	WirelessHART Manager
Casing Material	Aluminum
Ethernet Interface	RJ45 (10/100Base-TX)
Rated power supply voltage	24 Vdc
Power supply voltage	19.5 to 30 Vdc
Maximum current consumption	200 mA
Dissipated power	4,8 W
Power over Ethernet	Yes, 24 Vdc
Maximum number of nodes on the wireless network	50 nodes
Real time clock	Yes
WirelessHART Protocol version	7.1
Ethernet application protocols	HART and MODBUS TCP
Time synchronization	Yes, through NTP protocol
Configuration	Through an integrated web server
Diagnosis	Through an integrated web server
Operation temperature	0 to 60 ^{o}C
Storage temperature	-20 to 70 ^{o}C
Operation humidity	0 to 95 % (no condensation)
Protection index	IP 65
Weight	2.230 kg
Weight with package	2.600 kg
Dimensions	409,0 x 225,0 x 68,3 mm (height x width x depth)
Normas atendidas	- IEC 61131-2:2007, chapter 8 and 11 - ETSI EN 301 489-1 V1.9.2, chapter 8 and 9 - ETSI EN 300 328 V1.8.1, chapter 4.3.2 - ETSI EN 301 489-17 V2.1.1, chapter 6 - ANATEL resolution nº 506, section IX - ANATEL resolution nº 442 - ANATEL, technical requirements and trial procedures applied to product certification for telecommunication Category II.

Notes

Ethernet Interface: It is recommended the use of Category 6 cable (CAT6).

Consumption: Maximum consumption considering power supply voltage of 24 Vdc.

Power: Power considering power supply voltage of 24 Vdc.

Power over Ethernet: The power supply voltage of the Power over Ethernet (PoE) is the same as the rated voltage. In order to use the PoE, it is necessary to use external to the product injectors or adaptors. For details about the connection diagram in these cases, see section Installation Using Power over Ethernet.

Weight: Approximate weight, considering AL-2435 with the supply and Ethernet connectors, as well as the mounted antenna.

Dimensions: These dimensions consider the whole ser assembled, including the antenna and the connectors. For further details, check section Physical Dimensions.

Features of the Radio

	AL-2435
Type of Radio	IEEE 802.15.4
Maximum transfer rate	250 kbps
Frequency band	2.4 GHz
Receiver sensitivity	-98 dBm
Output power	10 dBm
Line-of-sight range	350 m (typical)

Notes

Transfer rate: This rate is the average, using all available channels for the standard, exchanging WirelessHART communication typical packs. This is a rate determined by the WirelessHART standard.

Range: According to the density of obstacle present in the plant and not being in line-of-sight, the range can be reduced.

Features of the Antenna

	AL-2435
Type of Antenna	Omnidirectional for outdoor environment
Gain	2 dBi

System Requirements for Using AL-2435

	System requirement
Operational System	Windows 2000, Windows XP, Windows Server 2003, Windows Vista or Windows 7
Navigator	Internet Explorer 6 or higher or another equivalent software
TCP Port enabled for MODBUS TCP server	502
TCP Port enabled for HTTP server (web server)	80
TCP Port enabled for HTTPS server (web server)	443
UDP Port enabled for NTP client	123

Notes

Operational System: The operational systems used for configuration and monitoring can be 32 bits or 64 bits, when applicable.

Ports: For the correct functioning of each service, the ports described in the chart shall be released. If necessary, contact your network administrator to release the ports.

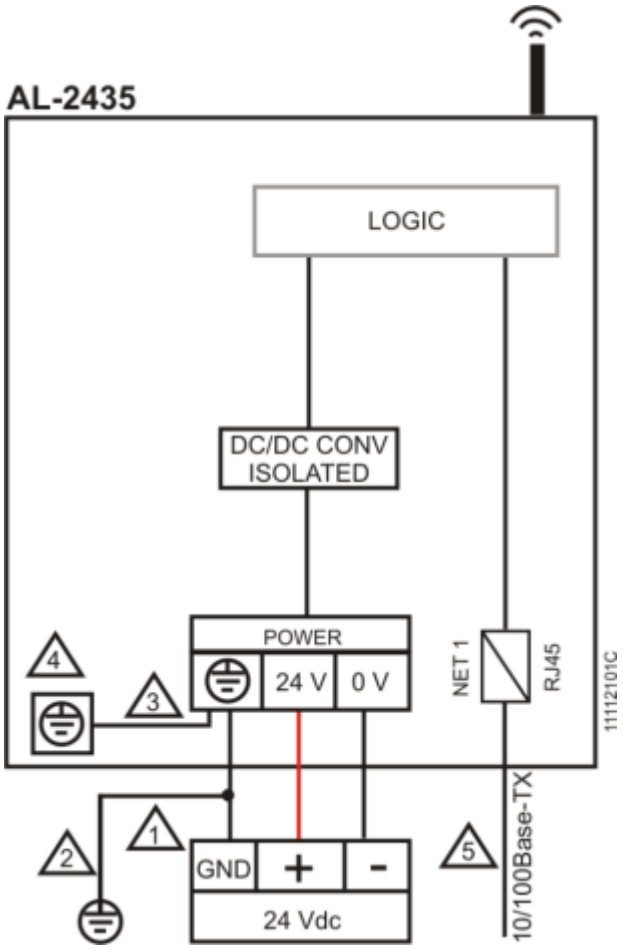
Installation

ATTENTION:
The device is sensitive to static electricity (ESD). Always touch a metallic grounded object before handling it.

Electrical Installation

Conventional Installation

The figure below presents the AL-2435 connection diagram using an external power supply source connected to the POWER connector and the NET1 interface connected directly to an Ethernet network.



Notes to the Diagram

1 – The external power supply source is connected to the terminals 24 V (terminal 2) and 0 V (terminal 3) of the POWER connector. This connection shall be performed using the supply connector delivered together with the AL-2435.

2 – The external power supply source grounding is connected to the terminal ⏚ (terminal 1) of the POWER connector and shall be connected to the external grounding and also to the GND of the external source. This connection shall be performed using the supply connector delivered together with the AL-2435.

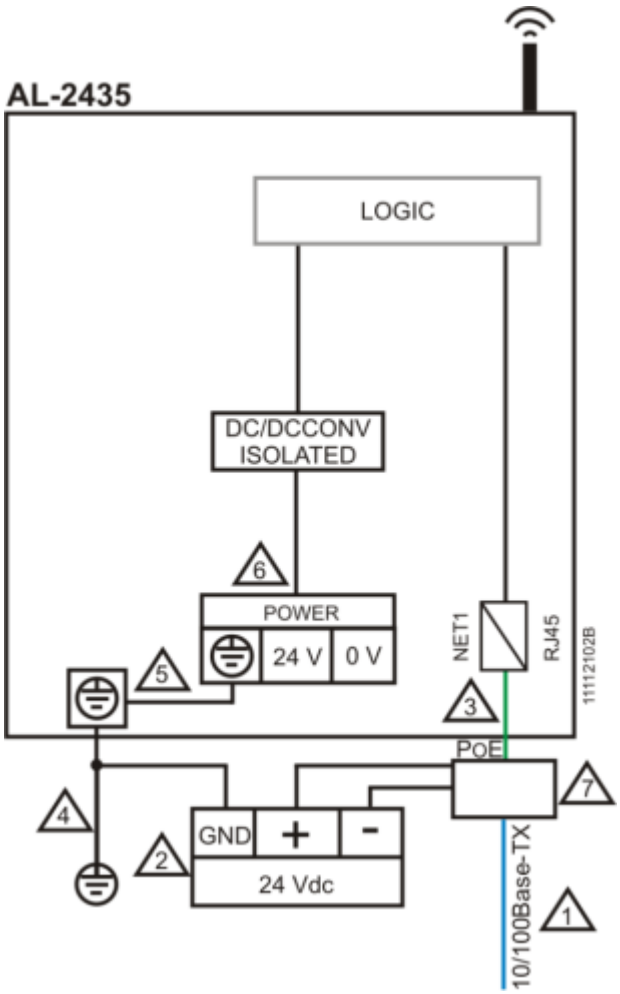
3 – The terminal ⏚ of the POWER connector (terminal 1) and the grounding screw ⏚ are internally connected to AL-2435.

4 – In case the grounding is done by the grounding screw ⏚, the terminal ⏚ of the POWER connector shall not be used. Thus, if the terminal ⏚ of the POWER connector (terminal 1) is connected to the grounding, as shown on the diagram of the figure above, the grounding screw ⏚ shall not be connected.

5 – Standard interface 10/100Base-TX. Use the connector supplied together with the AL-2435.

Installation Using Power over Ethernet

The figure below presents the diagram for connecting the AL-2435 using a Power over Ethernet (PoE) injector or adaptor, which is connected to the interface NET1 with no need of power supply connection source directly to the AL-2435.



Notes of the Diagram

1 – Standard interface 10/100Base-TX. Use a CAT5 standard Ethernet cable.

2 – The external source power supply is connected to the supply terminals of a Power over Ethernet (PoE) injector or adaptor.

3 – Use the Ethernet connector supplied together with the AL-2435 and mounted according to Connection of the Ethernet Connector for connection between the Power over Ethernet (PoE)) injector or adaptor and the AL-2435 connector NET1.

4 – On the diagram of the figure above, the grounding shall be done by means of the grounding screw ⏚, and the terminal ⏚ (terminal 1) of the POWER connector shall not be connected.

5 – The terminal ⏚ of the POWER connector (terminal 1) and the grounding screw ⏚ are internally connected in the AL-2435.

6 – The POWER connector shall not be used.

7 – In order to make the use of the diagram of the figure above possible, a Power over Ethernet (PoE) injector or adaptor. This equipment is connected to the power supply source and to the Ethernet network, providing power supply and Ethernet communication output and one only cable. This type of connection does not need using power supply on the AL-2435 POWER connector. The PoE injector or adaptor are not included in the AL-2435 packing and are not supplied by Altus.

Mechanical Installation

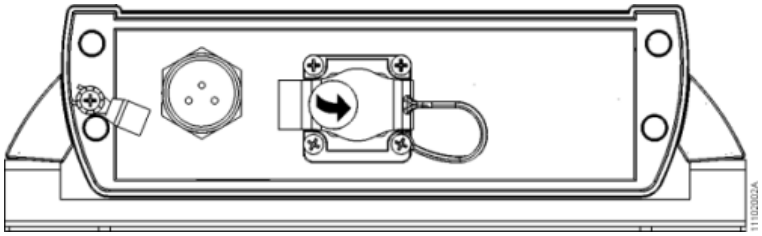
Connectors Assembly

The connectors available in the AL-2435 packing shall be used in order to guarantee the product sealing against water and particles presence. Thus, the mechanical assembled set assures IP 65 protection index to the product.

The assembly procedure of the Power Supply Connector and the Ethernet Connector are described on the AL-2435 User Manual (MU207603) available on Altus website: www.altus.com.br.

Connection of the Ethernet Connector

Before connecting the Ethernet cable, it is necessary to remove the NET 1 connector protection cap, according to the figure below.

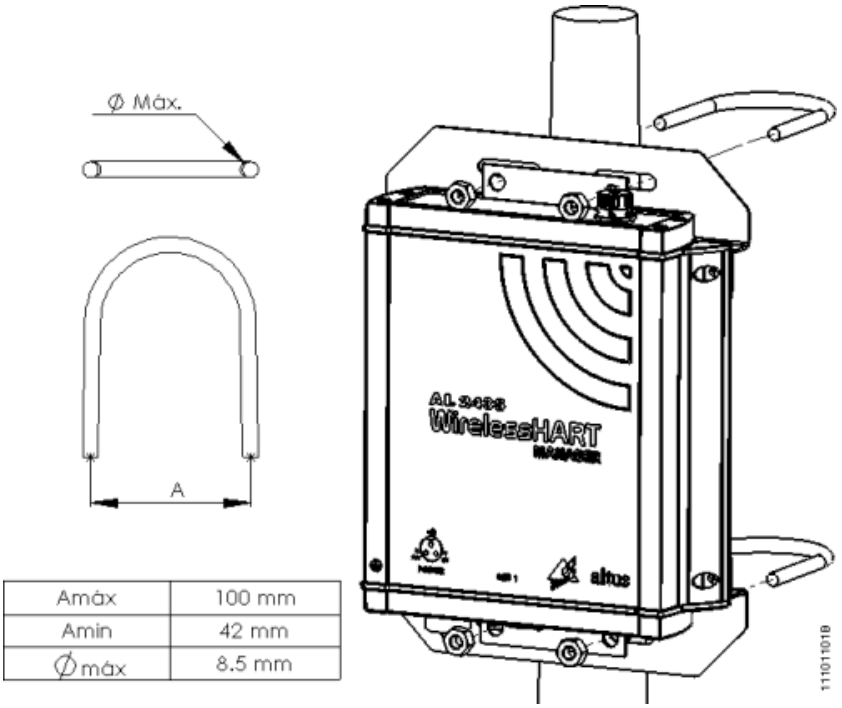


Installation of the Antenna

Before connecting the antenna, it is necessary to remove its connector protection cap, according to the figure below. Then connect the antenna according to the fixation procedures described below.

Mechanical Fixation on a Post

To fix the AL-2435 on a post, it is necessary to use a fixing clamp (this item is not provided along with the product), according to the figure below. As there is several models available on the market, it is recommended the use of screwed fixing clamp according to the procedure below. The clamp dimensions shall correspond to the dimensions of the fixing grooves. Thus, the clamp maximum section shall not exceed 8,5 mm and its diameter shall comply with the limits from 42 mm to 100 mm.

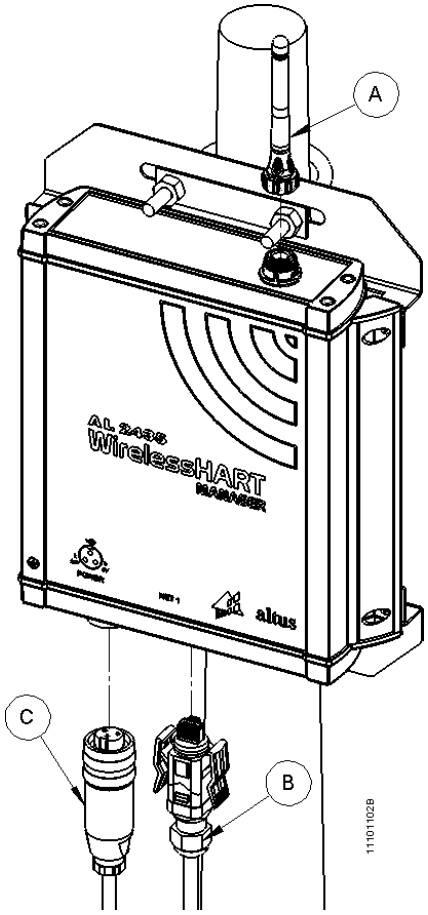


Amáx	100 mm
Amin	42 mm
Ø máx	8.5 mm

After fixing the AL-2435 on the post, connect the power supply and the Ethernet cables, as well as the antenna, as shown on the figure below.

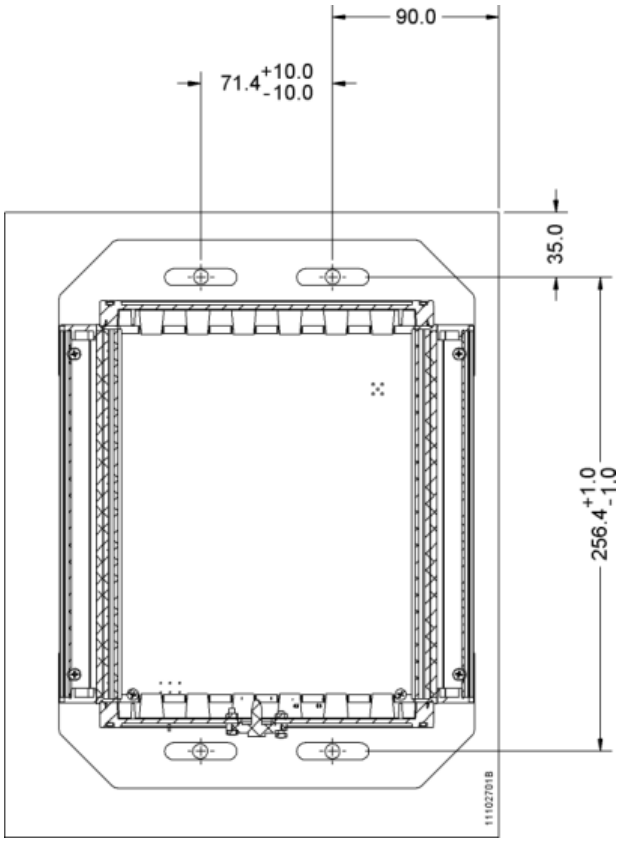
Notes

A – Antenna
B – RJ45 Connector
C – Power Supply Connector



Fixation Holes

The figure below presents a drilling diagram that shall be followed for the AL-2435 fixation. All dimensions are presented in mm.

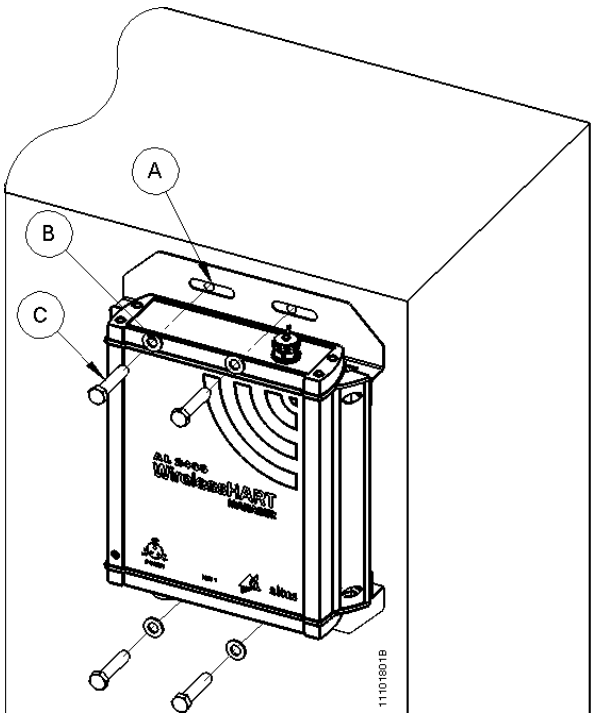


The minimum limits indicated on the figure shall be complied with in order to avoid that the AL-2435 is fixed beyond the wall borders. Furthermore, the drilling distances are indicated in the fixation grooves center, considering the maximum tolerance.

Mechanical Fixation on a Wall

Notes

A – M8 Wall Plug
B – M8 Washer
C – M8 Screw



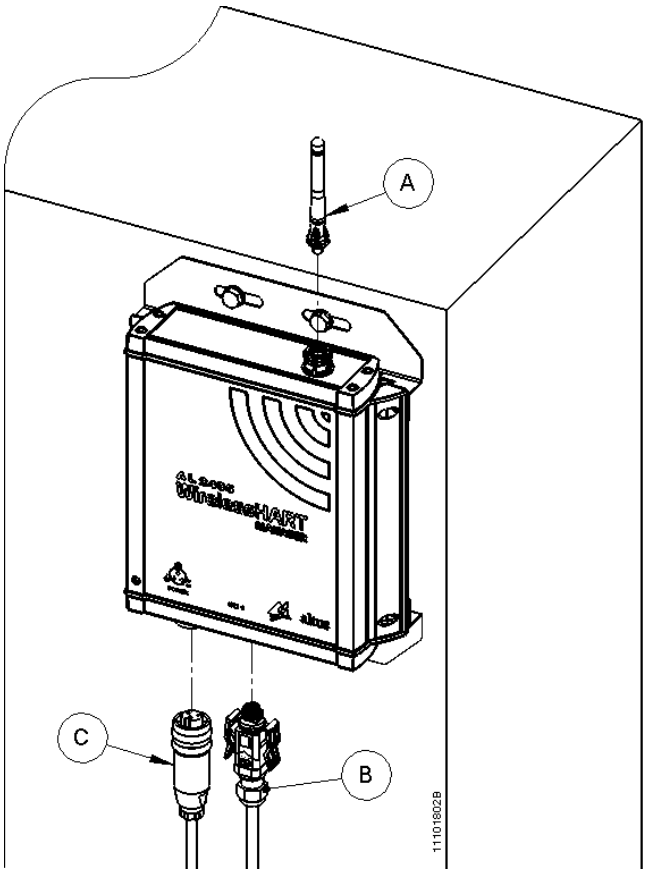
To fix the AL-2435 on the wall, it is necessary to drill according to section Fixation Holes. The fixation shall be performed using wall plugs, washers and screws(item not provided along with the product) with maximum size M8, according to the previous figure. After fixing the AL-2435 to the wall, connect the power supply and the Ethernet cables, as well as the antenna, as shown on the figure below.

Legenda

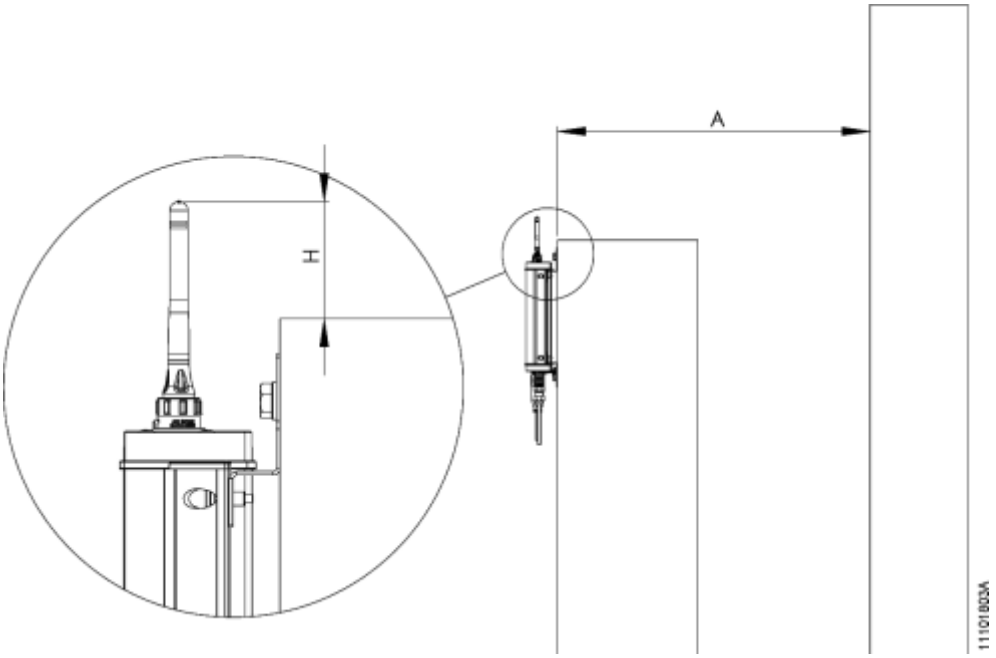
A – Antenna

B – RJ45 Conector

C – Power Supply Connector



Some additional care is necessary, when the AL-2435 is fixed on a wall. In order to assure other knots reach, it is necessary to position the antenna above the wall top, as shown on the figure below.



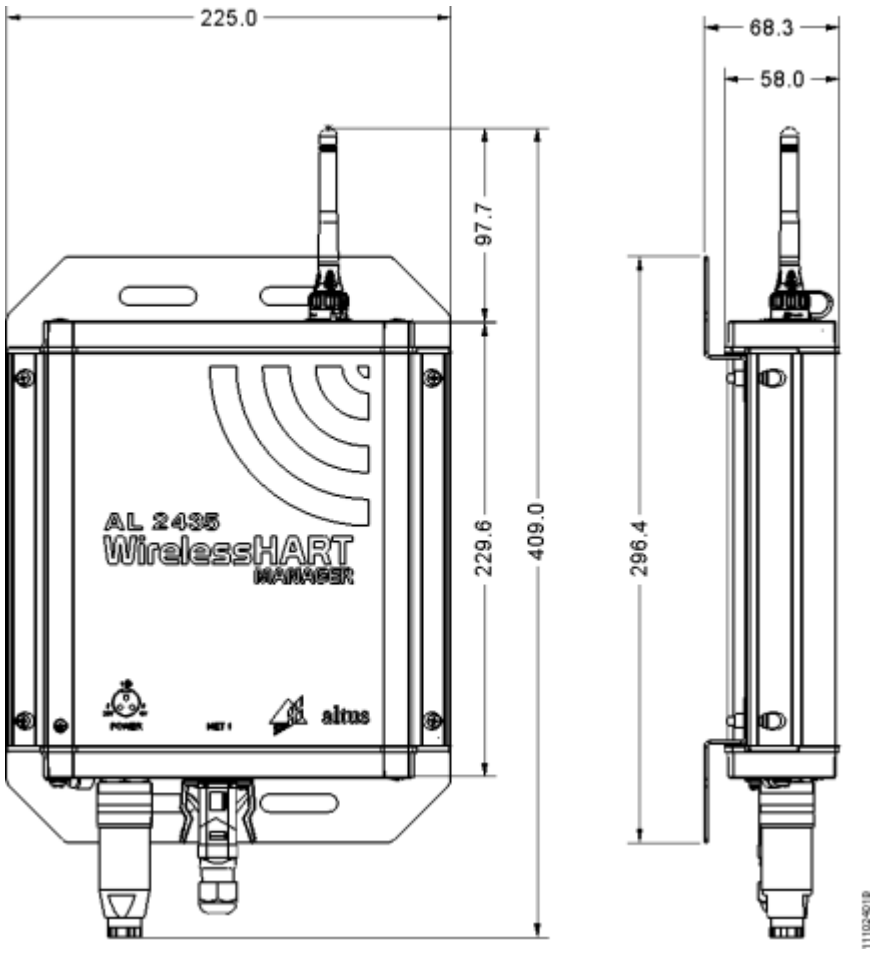
Furthermore, independently from the type of fixation used, the distance A (figure above) between the antenna and the nearest obstacle shall be at least equal to two wave lengths. For 2.4 GHz frequency, this distance shall be at least 250 mm.

Installation of Software

No software installation is necessary to access the AL-2435. The setup is carried out through a web setup manager. For further information about configuration, check the AL-2435 (MU207603) User Manual available on the Altus site www.altus.com.br.

Physical Dimensions

All dimensions are presented in mm.



Maintenance

For further information about maintenance, check the AL-2435 (MU207603) User Manual available on the Altus site www.altus.com.br.

Configuration

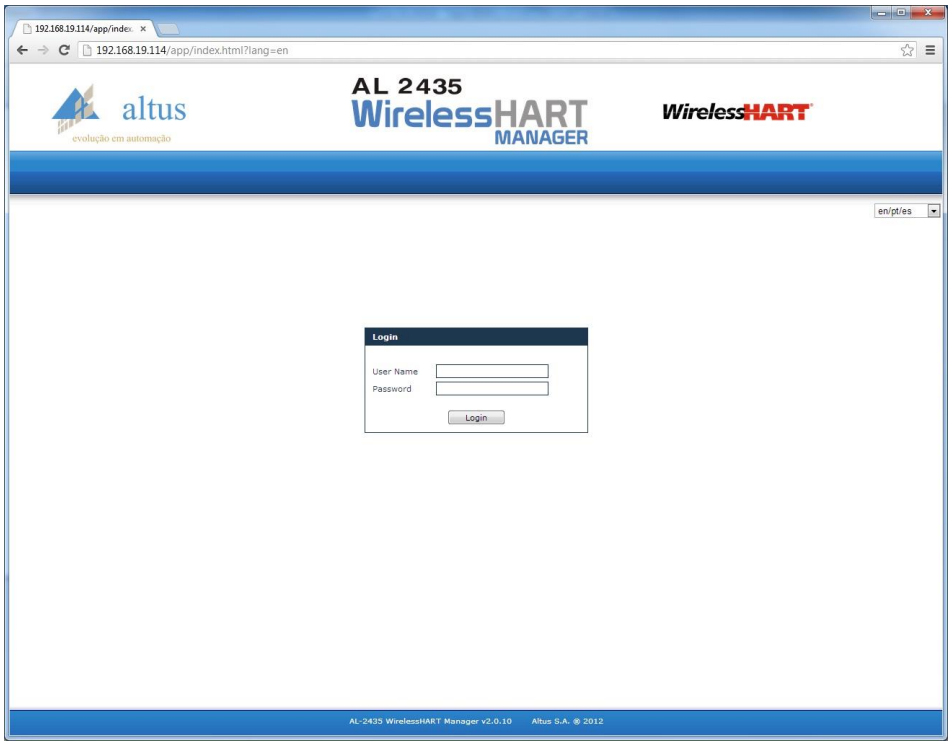
To set up the AL-2435 module, it is necessary to access it through a web navigator, using your IP address. The Ethernet network factory configuration is presented in the table below:

	Factory Configuration
IP address	192.168.0.101
Subnet mask	255.255.255.0
Default gateway	192.168.0.1

Note

Emergency address: there is na IP emergency address that cannot be changed and it is ever 172.17.17.17.

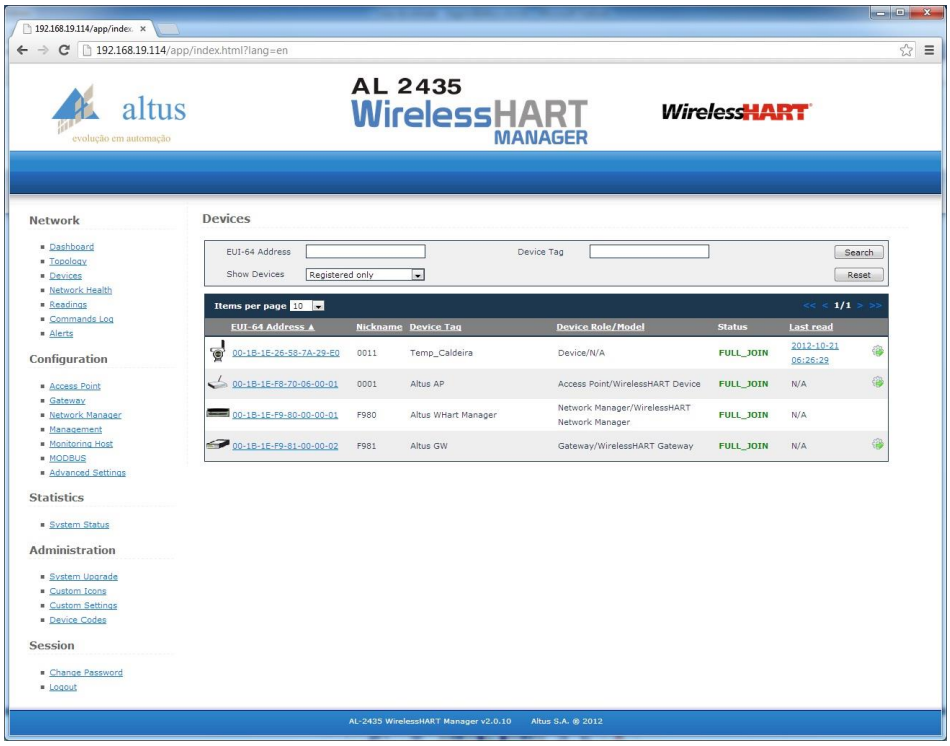
The login screen will be then presented.



To access the configurations, access as an administrator user:

- Username: admin
- Password: adminadmin

After accessing, it is possible to change the Ethernet configuration and the user´s configurations, as well as monitor and set up the WirelessHART tools, as shown on the figure below.



For further information about configuration, check the AL-2435 (MU207603) User Manual available on the Altus site www.altus.com.br.

Manuals

The following documents shall be checked for further technical details, configuration, installation and programming:

Document Code	Description
CE104634	AL-2434 Technical Features
MU207603	AL-2435 User Manual
MU209020	HART Network User Manual